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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SONG, HOON K

ART UNIT PAPER NUMBER

2882

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Tak Hoon K

Office Action Summary

Application No.

09/379,439

Applicant(s)

MCINTYRE ET AL.

Examiner

Hoon K Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 August 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-50, 52-53 are rejected under 35 U.S.C. 102(b) as being anticipated by Albert (US 4048496).

Regarding claim 1, Albert teaches a target irradiation system (figure 2 and 4) comprising:

an x-ray source (54) operable to emit x-rays;

a target object (61 or 62) capable of becoming radioactive upon receiving the emitted x-rays;

a relative positioning apparatus (78) operable to translate the target object relative to the x-rays.

Regarding claim 2, Albert teaches that said x-ray source includes an industrial linear accelerator having an x-ray generating target (figure 4).

Regarding claim 3, Albert teaches that said x-ray source includes means for emitting an x-ray beam including said x-rays and said system further comprising a means for shaping (57) said x-ray beam.

Regarding claim 5, Albert teaches that said relative positioning system includes a rotatable carousel (59) at least a portion of which is impinged upon by and receives at

least a portion of said x-rays, said rotatable carousel including at least one target mount for retaining at least one target object in fixed relation to said rotatable carousel (figure 4).

Regarding claim 6, Albert teaches that said rotatable carousel has at least one rotation angle at which each said at least one target mount is impinged upon by and receives said x-rays emitted from said x-ray source and at least one rotation angle at which said at least one target mount does not receive said x-rays (figure 4).

Regarding claim 7, Albert teaches that said relative positioning apparatus includes a tube assembly having:

- a stationary member defining an interior path for receiving the target object; and
- a translation assembly for moving the target object along a path within said stationary member, said path positioned such that the target object receives said x-rays emitted from said x-ray source (figure 4).

Regarding claim 8, Albert teaches that said stationary member defining an interior path is a tube (figure 4).

Regarding claim 9, Albert teaches that said tube assembly further comprises a heat transfer (79) apparatus supplying a heat transfer fluid within the interior of said stationary member defining an interior path (figure 3).

Regarding claim 10, Albert teaches that said translation assembly includes linear (Blossfeld reference) and rotational translation apparatus.

Regarding claim 11, Albert teaches that a plurality of members each defining an interior path and having an associated translation assembly for moving at least one

target object along said interior path within each said member defining an interior path, each said interior path positioned to be impinged upon by said x-rays emitted from said x-ray source (figure 4).

Regarding claim 12, Albert teaches that said stationary member defining an interior path includes an x-ray source activated by said beam of electrons to emit x-rays (figure 4).

Regarding claim 13, Albert teaches that said relative positioning apparatus includes a tube assembly having:

- a substantially stationary tube defining an internal target object conduit path; and
- a translation assembly for moving the target object within said stationary tube along a desired path positioned to be impinged upon by said x-rays emitted from said x-ray source (figure 4).

Regarding claim 14, Albert teaches that at least one sensor measuring parameters selected from a group including electron beam current, temperature, and radiation; and a control circuit controlling the electron beam provided by said electron beam source based on said parameters measured by said at least one sensor (figure 4).

Regarding claim 15, Albert teaches that said at least one sensor includes a radiation detector situate down stream of said relative positioning apparatus (figure 4).

Regarding claim 16, Albert teaches that said at least one sensor includes a metering circuit measuring the electric current received in an x-ray conversion target (figure 4).

Regarding claim 17, Albert teaches that said at least one sensor includes a temperature monitoring device measuring the temperature in proximity of said relative positioning apparatus (figure 4).

Regarding claim 18, Albert teaches that said at least one sensor includes:

A radiation detector situated downstream of said relative positioning apparatus;
and

A metering circuit measuring the electric current received in an x-ray conversion target (figure 4).

Regarding claim 19, Albert teaches that a radiation detector downstream of said relative positioning apparatus (figure 4).

Regarding claim 20, Albert teaches that said x-ray conversion target further comprises a metering circuit measuring the electron beam current received by the x-ray conversion target (figure 4).

Regarding claim 21, Albert teaches that said relative positioning apparatus includes a fixed positioning member retaining at least one target object in generally fixed relation to said x-ray source while positioned in the path of said x-rays (figure 4).

Regarding claim 22, Albert teaches that an electron beam directing apparatus between the electron beam source and an x-ray conversion target (figure 4).

Regarding claim 23, Albert teaches that said electron beam directing apparatus includes a magnetic means for directing the electron beam (figure 4).

Regarding claim 24, Albert teaches that a heat transfer system conduction heat away from an x-ray conversion target (figure 3).

Regarding claim 25, Albert teaches that said heat transfer system includes a conduit for conveying a heat transfer fluid (figure 3).

Regarding claim 26, Albert teaches that a thermal shield between an x-ray conversion target and at least one target object positioned on said relative positioning apparatus (figure 3).

Regarding claim 27, Albert teaches that an x-ray conversion target includes a plurality of layers wherein:

at least a first one of said layers comprises x-ray generating material;

at least a second one of said layers comprises an electron absorption apparatus between said x-ray generating material layer and said at least one target object positioned by said relative positioning apparatus (figure 4).

Regarding claim 28, Albert teaches that a thermal shield between said x-ray conversion target and said relative positioning apparatus (figure 4).

Regarding claim 29, Albert teaches that a chamber downstream of the x-ray source, said chamber including a target object entry port and wherein said relative positioning apparatus includes a translation armature extendable through said target object entry port (figure 4).

Regarding claim 30, Albert teaches that said translation armature includes a linearly translatable member mounting for receiving said at least one target object wherein the linearly translatable member (Blossfeld reference) defines a translation path including a first position within said chamber impinged upon by said x-rays, and a second position outside said chamber wherein said at least one target object is movable

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on said linearly translatable member between said first position and said second position, through said entry port.

Regarding claim 31, Albert teaches an Apparatus for irradiating a target object comprising (figure 3):

- an electron beam source providing a beam (23) of electrons;

- a positioning assembly including a rotatable carousel (59) having an axis of rotation and a radial edge, the electron beam source directing said beam of electrons to impinge upon and be received by the radial edge of said rotatable carousel, said rotatable carousel including:

 - an x-ray conversion target (54) in the rotatable carousel activated by said beam of electrons to emit x-rays;

 - a mounting station receiving at least one target object (61), said mounting station receiving x-rays emitted by said x-ray conversion target (54).

Regarding claim 32, Albert teaches that said positioning assembly includes a plurality of mounting stations each mounting at least one target object in a generally fixed relation to said x-ray conversion target (figure 3).

Regarding claim 33, Albert teaches that said electron beam is directed perpendicular to the axis of rotation of said rotatable carousel (figure 4, when electron hit center of the carousel).

Regarding claim 34, Albert teaches that said x-ray conversion target is located in said rotatable carousel (59).

Regarding claim 35, Albert teaches that said carousel includes a carbon-carbon fiber doped with said x-ray generating material (well know material, column 9 line 50+).

Regarding claim 36, Albert teaches that said rotatable carousel is rotatable from a first position in which said mounting station is aligned with said electron beam and a second position in which said mounting station is outside the path of said electron beam (figure 3 and 4).

Regarding claim 37, Albert teaches that a heat transfer system conducting heat away (79) from at least one of the carousel, x-ray conversion target and target object.

Regarding claim 38, Albert teaches that said heat transfer system includes a conduit (79) for conveying a heat transfer fluid.

Regarding claim 39, Albert teaches that said heat transfer system includes a plurality of fluid conduits (79) in said rotatable carousel.

Regarding claim 40, Albert teaches that an electron beam directing apparatus between said electron beam (23) source and said carousel.

Regarding claim 41, Albert teaches a target irradiation system comprising:

an electron beam source providing a beam of electrons;

a positioning assembly including a linearly movable translation armature, said translation armature mounted to said positioning assembly at least for linear motion in an axial direction, and said translation armature including a mounting apparatus mounting at least one target object;

an x-ray conversion target mounted on said translation armature;

between said translation armature and said electron beam source, wherein said x-ray conversion target defines a radial access region providing access to said at least one target object and said x-ray conversion target includes an x-ray generating material activated by said beam of electrons to emit x-rays; and a target object capable of becoming radioactive upon receiving the emitted x-rays.

Regarding claim 42, Albert teaches that said positioning assembly includes a means for moving said x-ray conversion target mounted on said translation armature between a first position range impinged upon by said electron beam, and a second x-ray conversion target position not impinged upon by said electron beam; and said positioning assembly includes a means for moving said at least one target object mounted on said mounting apparatus between a first target object position range corresponding to said first x-ray conversion target position range at which said at least one target object is positioned in the path of x-rays emitted by said x-ray conversion target and a second target object position not impinged upon by said electron beam.

Regarding claim 43, Albert teaches that an irradiation enclosure defining an interior space wherein said first x-ray conversion target position and said first target object position are within the interior space defined by said irradiation enclosure and said second x-ray conversion target position and said second target object position are outside said irradiation enclosure.

Regarding claim 44, Albert teaches that said x-ray conversion target is substantially planar.

Regarding claim 45, Albert teaches that said x-ray conversion target has an accurate cross-sectional shape.

Regarding claim 46, Albert teaches a target irradiation system comprising:

an electron beam source providing a beam of electrons on a path;

a rotatable carousel including:

a plurality of x-ray conversion targets (54) circumferentially positioned on said carousel, each of said plurality of x-ray conversion targets including an x-ray generating material activated by said beam of electrons (23) to emit x-rays when positioned in the path of the electron beam;

a plurality of mounting stations to receive at least one of said target objects, each of said mounting stations associated with one of said x-ray conversion targets and located on said carousel downstream its associated x-ray conversion target in the path of x-rays emitted from the associated x-ray conversion target when the x-ray generating material of the associated x-ray conversion target is activated by said beam of electrons to emit x-rays (figure 2 and 3); and

a target object (61) capable of becoming radioactive upon receiving the emitted x-rays.

Regarding claim 47, Albert teaches a target irradiation system comprising:

an electron beam source providing a beam of electrons (23) ;

an x-ray conversion target (54) in fixed relation to the electron beam source in the path of the beam of electrons from the electron beam source, the x-ray conversion

target including an x-ray generating material activated by the beam of electrons to emit said x-rays;

a target object (61) capable of becoming radioactive upon receiving the emitted x-rays;

an electron beam directing apparatus (figure 4) between the electron beam source and the x-ray conversion target; and

a retaining apparatus (figure 4) retaining the target object in relation to said electron beam source.

Regarding claim 48, Albert teaches a target irradiation system comprising:

an x-ray source means for generating x-rays (54); and

a positioning means for positioning at least one target object, in the path of said x-rays generated by said x-ray source means (54), including means for moving (78) at least one target object in relation to said x-rays generated by said x-ray source means; and

a target object (61) capable of becoming radioactive upon receiving the generated x-rays.

Regarding claim 49, Albert teaches that said x-ray source comprises: an electron beam (23) source means providing a beam of electrons;

an x-ray conversion target (54) means in fixed relation to the electron beam source in the path of the beam of electrons from the electron beam source, the x-ray conversion target including an x-ray generating material means for emitting x-rays when activated by said beam of electrons (figure 4).

Regarding claim 50, Albert teaches that said positioning means comprises a carousel (59) means including target object mounting means.

Regarding claim 52, Albert teaches a method of irradiating a target object comprising:

- providing a beam of electrons (23);

- positioning an x-ray conversion target (54) in fixed relation to said beam of electrons and impinging upon and receiving said beam of electrons;

- emitting x-rays from the x-ray conversion target when activated by said beam of electrons;

- selecting a target object (61) capable of becoming radioactive upon receiving the emitted x-rays;

- moving (78) at least one of target object in relation to said x-ray conversion target and in the path of the x-rays emitted by said x-ray conversion target.

Regarding claim 53, Albert teaches a method of irradiating a target object in a rotatable carousel having an axis of rotation comprising:

- selecting a target object (61) capable of becoming radioactive upon receiving x-rays;

- placing the target object in an aperture in the rotatable carousel (59);

- providing a beam of electrons (23) substantially perpendicular to said axis of rotation of the carousel (figure 4);

- activating an x-ray generating material in the rotatable carousel with said beam of electrons to emit x-rays (figure 4); and

impinging at least a portion of said x-rays upon the target object (61) placed in the aperture.

Claim 51 is rejected under 35 U.S.C. 102(b) as being anticipated by Blossfeld et al. (US 5185773).

Regarding claim 51, Blossfeld teaches a target irradiation system (figure 1) comprising:

an electron beam source providing a beam of electrons (18);

a positioning means (moving rack) including a means for linearly translating a translation armature for linear motion in an axial direction, and said translation armature including a mounting means for retaining at least one target object (14);

an x-ray conversion target (34) means mounted on said translation armature between said translation armature and said electron beam source, wherein said x-ray conversion target means defines a radial access region providing access to said at least one target object and said x-ray conversion target includes an x-ray generating material activated by said beam of electrons to emit x-rays (figure 1); and

a target object (14) capable of becoming radioactive upon receiving the emitted x-rays.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Albert in view of Fischell et al. (US 5059166).

Regarding claims 4 and 54, Albert teaches a selectable wavelength x-ray source comprising a step of:

- providing a beam of electrons (23);

- providing an x-ray conversion target (54) in fixed relation to the beam of electrons;

- emitting x-rays from the x-ray conversion target when activated by said beam of electrons; and

- moving at least one target (61) in the path of said x-rays emitted by the x-ray conversion target.

However Albert fails to teach that the target is medical stent.

Fischell teaches a radioactive medical stent (figure 1).

In view of Fischell, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to substitute Albert's secondary target (61) with Fischell's stent in order to produce radioisotope material using the X-ray (column 2 line 11+). Accordingly, one would be motivated to substitute the final target (61) with any material because it would produce a fluorescent x-ray source which can be inserted in a body of animal (column 1 line 40+) .

Response to Arguments

Applicant's arguments with respect to claims 1-54 have been considered but are moot in view of the new ground(s) of rejection.


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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon K Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 703-305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-4858 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2000

Hoon Song
May 17, 2003